

RX-337

ERITEL AB

Person to charge, Telephone
Göran Carlsson, +46 31 105935

Date
August 17, 1990
Your communication of

Our reference
ET/VD/2370/90
Your reference

Chairman of Mobitex Operators Association
Jan-Olof Runnäs
Televerket Radio
136 80 RANINGE

AUG 27 1990

To the members of
the NOA Technical Guidance Council

Televerket Radio, SWEDEN
Telecom Finland, FINLAND
Norwegian Telecom, NORWAY
Cantel Inc, CANADA
RAM Mobile Data Inc, USA
RAM Mobile Data Ltd, UK

Dear Sirs

First, I would like to thank the members of the NOA technical group for their contributions to the specification for the battery-saving protocol for handportable terminals.

As agreed at the NOA meeting in Toronto and at the meeting at our office in Gothenburg we hereby send you the first official issue of the battery-saving protocol for portable terminals. It is distributed to Televerket Radio (SWEDEN), Telecom Finland (FINLAND), Norwegian Telecom (NORWAY), Cantel Inc (CANADA) and RAM Mobile Data Inc (USA).

Below are some aspects on the specification.

TERMINAL TYPES , TTX

The specification for the battery-saving protocol is considered as an addendum to the 8kb terminal specification, meaning that terminals must conform to the Mobitex Terminal Specification 8kb, Terminal Type 3, RIA as well as to the battery-saving protocol.

Terminals that follows the battery-saving protocol have the Terminal Type 4 (TTI = 4).

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Page
2

Date
August 17, 1990

Our reference
ET/VD/2370/90

DOCUMENT HANDLING

The network operator may chose if the battery-saving protocol should be included in the binder for Terminal Type 3 or put together in a new binder for Terminal Type 4. We enclose a caption list and a document list for a Terminal Type 4 binder.

ENCLOSED DOCUMENTS

1. CAPTION LIST 001 53-03/LZBA 703 1001 1990-08-17 A
2. LIST OF DOCUMENTS 00151-03/LZBA 703 1001/05 1990-08-17 A CANTEL
3. LIST OF DOCUMENTS 00151-03/LZBA 703 1001/06 1990-08-17 A RMD
4. ADDENDUM 1056-A296 6084 1990-08-13 A
 (BATTERY-SAVING PROTOCOL FOR PORTABLE TERMINALS)

We are looking forward to a continuous co-operation with NOA and remain

Yours truly


Ake Johansson
President
ERITEL AB

ERITEL AB
RUBRIKÖFTECKNING
CAPTION LIST

Delansvarsteman - Delansvar number	
001 53 - 03/L2BA 703 1001	Arrangement of the documents 1
Granskad - Approved ET/SYSC STT STT	MOBITEX system description 2
System dater 1990-08-17 A	General description of terminals 3
Färd - Baser MOBITEX TERMINAL SPECIFICATION	Terminology 4
Öppning 0	References 5
	Network operator information 6
	7
	Application layer 8
	Network layer
	10
	Interface requirements, fixed terminals 11
	Other requirements, fixed terminals 12
	13
	14
	Addendum : Battery-saving protocol for Portable Terminals 15
	Link layer, mobile terminals 16
	Physical layer, mobile terminals 17
	Radio equipment, mobile terminals 18
	Other interfaces, mobile and fixed terminal 19

Dokumenttitel
LIST OF DOCUMENTS

Blatt Sheet
1(2)

Ursprung - Prepared ET/SYS MÖt	Führungsverantwortung - Subject responsible ET/SYS MÖt	Nr No 001 51 - 03/LZBA 703 1001/05 Ue
Dokumente/Gefördert - Doc request/sponsored ET/SISC STT 977	Datum - Date 1990-08-17 A	Rev MTSOLD.5
Bezeichnung MOBITEX TERMINAL SPECIFICATION Fixed and mobile terminal with addendum for portable terminal		

This set of documents, entitled "MOBITEX TERMINAL SPECIFICATION" applies to:

MOBITEX system: Cantel Inc, Canada
Fixed and mobile terminal with
addendum for portable terminal

Terminal type: 4
900 MHz/8 kbps

Binder identification: LZBA 703 1001/05, R1A

COMMON SECTIONS:

Section	Document number	Rev
Caption List	001 53 - 03/LZBA 703 1001 Ue	A
<u>Section 1:</u> Arrangement of documents List of documents	1551 - LZBA 703 1001 Ue This document	E
<u>Section 2:</u> System description MOBITEX	1551 - A 296 5073 Ue	J
<u>Section 3:</u> General description terminals	1056 - A 296 5170 Ue	B
<u>Section 4:</u> Terminology	0033 - LZBA 703 1001 Ue	E
<u>Section 5:</u> References	0015 - LZBA 703 1001 Ue	E
<u>Section 6:</u> Network operator documents		
<u>Section 8:</u> Application layers	2/1056 - A 296 5171 Ue	G
<u>Section 9:</u> Network layer	5/1056 - A 296 5171/2 Ue	A
Appendix A, Packet formats	51/1056 - A 296 5171/2 Ue	A
Appendix B, Dialogues	52/1056 - A 296 5171/2 Ue	A
Appendix C, Logical description	53/1056 - A 296 5171/2 Ue	A

Bildzeit

001 51 - 03/LZBA		703 1001/05
Docum-Data	Rev	File-File
1990-08-17	A	MTS01D.5

FIXED TERMINAL SECTIONS:

Section	Document number	Rev
<u>Section 11:</u>		
X.25 interface, fixed terminal	1056 - A 296 5491 Ue	C
HDLc interface, fixed terminal	6/1056 - A 296 5171 Ue	E
BSC interface, fixed terminal	1056 - A 296 5490 Ue	C
MASC interface, fixed terminal	1056 - A 296 5516 Ue	D
Asynchronous terminals, MPAD	1056 - A 296 5454 Ue	C
<u>Section 12:</u>		
Other requirements, fixed terminal	1056 - A 296 5176 Ue	C

MOBILE TERMINAL SECTIONS:

Section	Document number	Rev
<u>Section 15:</u>		
Addendum : Battery-saving protocol for portable terminals	1056 - A 296 6084 Ue	A
<u>Section 16:</u>		
Link layer, mobile terminal	9/1056 - A 296 5171/02 Ue	A
Appendix A, Frames	91/1056 - A 296 5171/A2 Ue	A
<u>Section 17:</u>		
Physical layer, mobile terminals	10/1056 - A 296 5171/02 Ue	A
<u>Section 18:</u>		
Radio equipment, mobile terminals	1056 - A 296 5173/04 Ue	A
Appendix A, Measurement methods	A/1056 - A 296 5173/01 Ue	C
<u>Section 19:</u>		
Other interfaces, mobile and fixed terminals	1056 - A 296 5175/3 Ue	A
Appendix A, Commands	2/1056 - A 296 5175/2 Ue	A
Appendix B, Application example	1/1056 - A 296 5175 Ue	B
<u>Section 20:</u>		
General requirements, mobile terminals	1056 - A 296 5177/02 Ue	A

Endsheet

LIST OF DOCUMENTS

Ref Sheet
1(2)

Urgent - Prepared ET/SYS MÖt	Falschierung - Subject responsible ET/SYS MÖt	Dr.-Nr. 001 51 - 03/LZBA 703 1001/06 Ue
Dokument/Objekt/Date responsible ET/SYSC STT 577	Datum - Date 1990-08-17	Rev A
Bestimmung	Titel MOBITEX TERMINAL SPECIFICATION Fixed and mobile terminal with addendum for portable terminal	

This set of documents, entitled "MOBITEX TERMINAL SPECIFICATION" applies to:

MOBITEX system: Ram Mobile Data Inc, USA
Fixed and mobile terminal with
addendum for portable terminal

Terminal type: 4
900 MHz/8 kbps

Binder identification: LZBA 703 1001/06, R1A

COMMON SECTIONS:

Section	Document number	Rev
Caption List	001 53 - 03/LZBA 703 1001 Ue	A
<u>Section 1:</u> Arrangement of documents List of documents	1551 - LZBA 703 1001 Ue This document	E
<u>Section 2:</u> System description MOBITEX	1551 - A 296 5073 Ue	J
<u>Section 3:</u> General description terminals	1056 - A 296 5170 Ue	B
<u>Section 4:</u> Terminology	0033 - LZBA 703 1001 Ue	E
<u>Section 5:</u> References	0015 - LZBA 703 1001 Ue	E
<u>Section 6:</u> Network operator documents		
<u>Section 8:</u> Application layers	2/1056 - A 296 5171 Ue	G
<u>Section 9:</u> Network layer	5/1056 - A 296 5171/2 Ue	A
Appendix A, Packet formats	51/1056 - A 296 5171/2 Ue	A
Appendix B, Dialogues	52/1056 - A 296 5171/2 Ue	A
Appendix C, Logical description	53/1056 - A 296 5171/2 Ue	A

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001 51 - 03/LZBA 703 1001/06		
Date - Date 1990-08-17	Rev A	File - File MTS01D.6
<u>FIXED TERMINAL SECTIONS:</u>		
Section	Document number	Rev
<u>Section 11:</u>		
X.25 interface, fixed terminal	1056 - A 296 5491 Ue	C
HDLC interface, fixed terminal	6/1056 - A 296 5171 Ue	E
BSC interface, fixed terminal	1056 - A 296 5490 Ue	C
MASC interface, fixed terminal	1056 - A 296 5516 Ue	D
Asynchronous terminals, MPAD	1056 - A 296 5454 Ue	C
<u>Section 12:</u>		
Other requirements, fixed terminal	1056 - A 296 5176 Ue	C
<u>MOBILE TERMINAL SECTIONS:</u>		
Section	Document number	Rev
<u>Section 15:</u>		
Addendum : Battery-saving protocol for portable terminals	1056 - A 296 6084 Ue	A
<u>Section 16:</u>		
Link layer, mobile terminal	9/1056 - A 296 5171/02 Ue	A
Appendix A, Frames	91/1056 - A 296 5171/A2 Ue	A
<u>Section 17:</u>		
Physical layer, mobile terminals	10/1056 - A 296 5171/02 Ue	A
<u>Section 18:</u>		
Radio equipment, mobile terminals	1056 - A 296 5173/04 Ue	A
Appendix A, Measurement methods	A/1056 - A 296 5173/01 Ue	C
<u>Section 19:</u>		
Other interfaces, mobile and fixed terminals	1056 - A 296 5175/3 Ue	A
Appendix A, Commands	2/1056 - A 296 5175/2 Ue	A
Appendix B, Application example	1/1056 - A 296 5175 Ue	B
<u>Section 20:</u>		
General requirements, mobile terminals	1056 - A 296 5177/02 Ue	A

Robert

REQUIREMENT SPECIFICATION 1(36)

ET/SYS IK	ET/SYS GC	No. 1056 - A 296 6084 Ue
ET/SYSC STT		1990-08-13 A MTS15 1
		ADDENDUM BATTERY-SAVING PROTOCOL FOR PORTABLE TERMINALS

ABSTRACT

This document specifies additional requirements for portable terminals to be connected to the MOBITEK system. It should be considered as an ADDENDUM to the MOBITEK Terminal Specification (MTS) for 8 kbps mobile terminals, LZBA 703 1001, RIA.

A battery-saving protocol is introduced on the data link layer, as well as a new MPAK on the network layer. Both requirements and recommendations for the application layer are presented. Finally, a new command for type approval is included in the MASC interface.

Some of the parameters and protocol procedures mentioned in this document are described incompletely. A full description of them is only presented in the MTS.

Author:

Report

S. No.		1056 - A 296 6084 Ue	
Drawn Date	Rev	PC No	
1990-08-13	A	MTS15_1	

TABLE OF CONTENTS

1	INTRODUCTION	3
2	GENERAL DESCRIPTION OF OPERATING PRINCIPLES	4
3	DATA LINK LAYER	5
3.1	PRINCIPLES OF THE BATTERY-SAVING PROTOCOL	5
3.1.1	States	5
3.1.2	Roaming and roaming parameters, <SVP3>	6
3.1.3	Fleet division, <SVP4>	8
3.1.4	Mail list, <SVP5>	8
3.1.5	Traffic list, <SVP6>	8
3.1.6	Synchronization to the network, <SVP6>	9
3.2	MESSAGE TRANSACTIONS	11
3.2.1	Up-link traffic	11
3.2.2	Down-link traffic	11
3.2.3	Line connections	13
3.3	FORMAT DEFINITION OF <SVP>-FRAMES	14
3.3.1	<SVP3>	15
3.3.2	<SVP4>	19
3.3.3	<SVP5>	21
3.3.4	<SVP6>	24
4	NETWORK LAYER	28
4.1	ACTIVATION/INACTIVATION	28
4.2	NEW PARAMETERS IN MPAK INFO (terminal information)	29
4.3	ADDITIONAL MPAK - MODE (mode information)	29
5	APPLICATION LAYER	32
5.1	REQUIREMENTS	32
5.1.1	'Fall-back' to normal mobile operating mode	32
5.1.2	User notification of 'lost contact'	32
5.1.3	RSSI when transmitting	32
5.2	RECOMMENDATIONS	33
5.2.1	Manual selection of operating mode	33
5.2.2	Prevention from automatic quick channel monitoring	33
5.2.3	Manual initiation of quick channel monitoring	33
6	MASC INTERFACE	34
6.1	PA-command	35
7	MOBITEX TERMINAL SPECIFICATION REFERENCE LIST	36

Back

Page

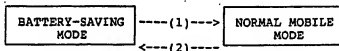
References

St. No. 1056 - A 296 6084		Ue
Drawn Date 1990-08-13	Rev A	Rev Date MTS15_1

2 GENERAL DESCRIPTION OF OPERATING PRINCIPLES

A portable terminal is basically a mobile terminal. It conforms to the requirements for ordinary mobile terminals, but with the additional ability to use a battery-saving protocol in the data link layer.

A portable terminal using the battery-saving protocol described in this document is said to be in the battery-saving mode of operation. If it follows the protocol used by ordinary mobile terminals it is said to be in the normal mobile mode of operation.



The reasons for a change of mode might be:

- (1) - external power source connected
 - operator command (e.g. in case of a major data transaction)
 - no <SVP6> received, only <SVP1> ("fall-back" situation)
- (2) - external power source disconnected

The battery-saving protocol includes a standby state for the terminal, during which no messages are transmitted or received, and an operating state.

Whenever the terminal wants to transmit a message it enters the operating state, awaits a <FRI>-frame and transmits in a slot that is chosen at random. The terminal then stays in the operating state for some time to be able to receive a quick message response.

Current down-link traffic to portable terminals is indicated by the TRAFFIC LIST of the <SVP6>-frame. Traffic stored in the network mailbox is indicated by the MAIL LIST of the <SVP5>-frame.

The roaming procedure of the portable terminal is essentially the same as for ordinary mobiles, but is controlled by a separate set of parameters in the <SVP3>-frame.

To order (a part of) the fleet of portable terminals to a certain channel the frame <SVP4> is used.

Page 1

Page 2

No. 1056 - A 296 6084 De	
Date 1990-08-13 A	File MTS15_1

3 DATA LINK LAYER

3.1 PRINCIPLES OF THE BATTERY-SAVING PROTOCOL

3.1.1 States

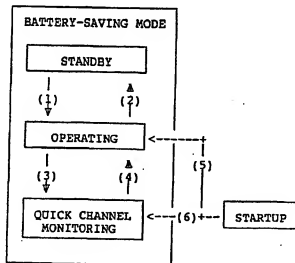
A portable terminal uses three different states of operation in the battery-saving mode:

- standby
- operating
- quick channel monitoring (roaming)

In the standby state only time keeping functions for synchronizing the terminal to the base station are working.

In the operating state messages are transmitted and received, and the roaming values of base stations are evaluated.

In the quick channel monitoring a list of channels is scanned until a new base is found.



where:

- (1) and (2) are described together with <SVP6> and in the chapter "MESSAGE TRANSACTIONS"
- (3) - (6) are described in the chapter "Roaming and roaming parameters"

Doc. No.		1056 - A 296 6084 Ue	
Date of Issue	1990-08-13	Rev.	A
		File No. MTS15_1	

3.1.1.2 Roaming and roaming parameters, <SVP3>

The roaming procedure for portable terminals basically follows the roaming procedure for mobile terminals. Please refer to reference RI-16 for further information.

When the terminal is switched on, it uses the stored values of CURRENT BASE and CURRENT SYSTEM CHANNEL. If there is no CURRENT BASE stored, the terminal directly starts the quick channel monitoring using the default list of system channels.

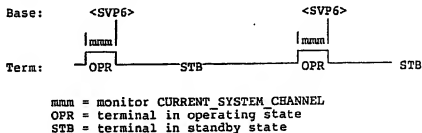
When a suitable base station has been found and the MPAK ROAM/ACTIVE has been sent to it, the portable terminal synchronizes to the <SVP6>-frames.

The normal channel monitoring of the roaming procedure is carried out during the time when the terminal is in the operating state. The terminal measures the averaged received signal strength and calculates a roaming value.

The system parameters controlling the roaming procedure for portable terminals are defined in the <SVP3>-frame. This makes it possible to use different parameters for mobile terminals (defined in the <SVPL>-frame) and for portable terminals.

If the parameter SCAN_TIME is set to 0, the terminal only monitors the CURRENT_SYSTEM_CHANNEL during the operating state.

Example 1: SCAN_TIME is set to 0. Only <SVP6>-frames are shown in this figure.



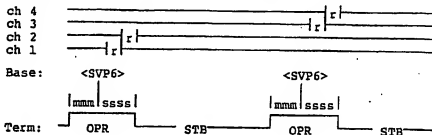
If SCAN_TIME is in the range 1 to 255, the terminal monitors other channels according to the channel list information from <SVP3> or from the permanently stored default list. However, the terminal must not leave the CURRENT SYSTEM CHANNEL to monitor other channels during the sweep cycle if it is addressed in the TRAFFIC LIST.

3.1.1.2

3.1.1.2

Doc No	1056 - A 296 6084	Ue
Doc Date	1990-08-13	A
Doc Rev		MTS15_1

Example 2 : SCAN_TIME is in the range 1 to 255.



m = monitor CURRENT SYSTEM CHANNEL
 s = scan other system channels
 r = RSSI PERIOD
 OPR = terminal in operating state
 STB = terminal-in-standby state

Criteria for leaving CURRENT BASE

The same criteria for leaving the CURRENT BASE applies for a portable terminal as for the mobile terminal but with parameters from the <SVP3> frame. The fifth criterion (item number 5) is replaced by the following rule:

If the terminal has not succeeded to synchronize within another 60 seconds, it should start the quick channel monitoring (roaming).

Evaluation of other base stations

The integration time for evaluating base stations on the CURRENT SYSTEM CHANNEL is indicated in <SVP6> (default value 60 seconds).

The integration time for evaluating base stations on other channels is also indicated in <SVP6> (default value 3 RSSI periods).

Quick channel monitoring

During the quick channel monitoring when the parameter SCAN_TIME is set to 0 and when the terminal has found a base with roaming value higher than GOOD BASE, the terminal should remain on that channel for at least 5 seconds during the measuring of received signal strength. Please refer to item number 4 in the description of 'quick channel monitoring' in the ROAMING chapter, reference R1-16.

1056 - A 296 6084 De	
Begin Date 1990-08-13 A	File # MTS15_1

3.1.3 Fleet division, <SVP4>

To order the fleet of portable terminals (or parts of it) to a certain system/access channel the <SVP>-frame of subtype 4 is used: <SVP4>. It is interpreted in same way as the <SVP2>-frame for mobile terminals, described in reference R1-16.

3.1.4 Mail list, <SVP5>

Messages not acknowledged by the terminal may be stored in the network mailbox according to the conditions described in R1-09 .

In order to inform terminals that have messages in the network mailbox, the MAIL LIST is used.

The MAIL LIST is included in the <SVP>-frame of subtype 5: <SVP5>.

3.1.5 Traffic list, <SVP6>

The TRAFFIC LIST contains the terminal/group-MAN of those terminals that must remain in the operating state in order to receive down-link traffic from the network.

This list is included in the <SVP>-frame of subtype 6: <SVP6>.

Terminals not included in the TRAFFIC LIST may return directly to the standby state.

Page no

1056 - A 296 6084 0e	
1990-08-13 A	MTS15_1

3.1.6 Synchronization to the network, <SVP6>

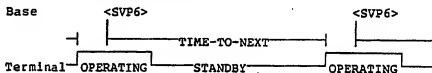
The network periodically transmits <SVP6>-frames on system channels where the battery-saving protocol is used.

Terminals using this protocol cyclically shifts between the standby state and the operating state. This shifting is synchronized by the <SVP6>-frames.

The <SVP6> contains the parameter TIME-TO-NEXT. The value of this parameter defines the next time the terminal should enter the operating state.

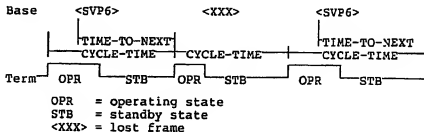
Once it has entered the operating state the terminal remains there, until it receives an <SVP6>-frame containing a TRAFFIC LIST in which it is not included.

Example 1: The terminal uses TIME-TO-NEXT for synchronization.



The <SVP6> also contains the parameter CYCLE-TIME. The value of this parameter defines the time between the start of one operating state and the start of the next one. If one or more of the <SVP6> frames are lost, the terminal should use the CYCLE-TIME parameter in order not to lose synchronization.

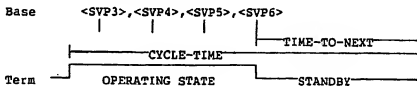
Example 2: The terminal is using CYCLE-TIME in order to maintain synchronization when a <SVP6> has been lost.



If the network is going to send other <SVP>-frames, when the terminals are in the operating state, they will be sent prior the <SVP6> frame. The <SVP6> ends the sequence of <SVP>-frames.

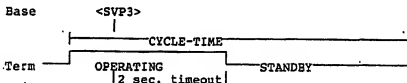
No. 1056 - A 296 6084	Ue
Date: 1990-08-13	Rev: A
	File: MTS15_1

Example 3: Multiple sweep frames are received during the operating state.



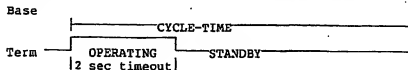
After the reception of every <SVP3> to <SVP5> the terminal stays in operating state for another 2 seconds or until it receives an <SVP6>.

Example 4: The terminal receives a <SVP3> but the <SVP6> is not received. The operating state is terminated by the 2 second timeout. The timeout is counted from the reception of the <SVP3> frame.



If none of the <SVP3> to <SVP6> has been received within 2 seconds from the transition to the operating state, the terminal may return to standby.

Example 5: No <SVP>-frames are received within 2 seconds from the start of the operating state.



If the terminal has lost consecutive <SVP6>-frames during 60 seconds, it should stay in the operating state to synchronize again.

If the terminal has not succeeded to synchronize within another 60 seconds, it should start the quick channel monitoring (roaming).

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No. 1056 - A 296 6084 Ue	
Date 1990-08-13	File MTS15_1

3.2 MESSAGE TRANSACTIONS

3.2.1 Up-link traffic

The access requirements for up-link traffic from portable terminals are basically the same as those for mobile terminals.

A portable terminal that is going to transmit a message to the network enters the operating state. It awaits a valid <PRI>-frame from the network and then chooses a random slot for its transmission.

When <ABD> is used to request access for transmission, the terminal must remain in the operating state until the message is transferred successfully or the dialogue is otherwise terminated.

After a message is successfully transferred to the network the terminal remains in the operating state during a specified period of time before it returns to the standby state. This period is defined by the parameter TRANSACTION-TIME in <SVP6> and makes it possible to transmit a quick reply message to the terminal without waiting for the next transmission of a TRAFFIC LIST. During the period a logical down-link channel might be said to exist between the terminal and its base station.

3.2.2 Down-link traffic

Down-link traffic to terminals is indicated by the TRAFFIC LIST. When a terminal receives a list containing one of its addresses (terminal or group MAN) it remains in the operating state.

When a message is successfully received, the terminal remains in the operating state during the period of time defined by the parameter TRANSACTION-TIME (included in <SVP6>). If this period expires without any further messages, the terminal returns to the standby state.

When <BKD> is used to order the terminal to another channel for a down-link transmission, the terminal must remain in the operating state until the message is received successfully or the dialogue is otherwise terminated.

A terminal may also leave the operating state when it receives a TRAFFIC LIST in which it is not addressed.

1056 - A 296 6084 Ue		
Date	Rev.	Fl. P. n.
1990-08-13	A	MTS15 1

Example 1: The terminal is not addressed in the TRAFFIC LIST.

Base : <SVP6>

Term : OPR STB OPR STB

OPR = terminal in operating state
STB = terminal in standby state

Example 2: The terminal is addressed in the TRAFFIC LIST of <SVP6> and the network has one <MRM> to transmit.

Base : <SVP6> <MRM> <SVP6>
 | |
 T_T

Term : OPR STB OPR STB

TT = TRANSACTION-TIME
OPR = terminal in operating state
STB = terminal in standby state

Example 3: The terminal is addressed in the TRAFFIC LIST of <SVP6> and the network transmits multiple <MRM>:s during the sweep cycle.

Base : <SVP6> <MRM> <MRM> <SVP6>

 | | | |

 | | | |

 | | | |

Term : OPR STB OPR STB

TT = TRANSACTION-TIME
OPR = terminal in operating state
STB = terminal in standby state

1056 - A 296 6084 Ue	
Date Recd 1990-08-13	File No MTS15_1

3.2.3 Line connections

Call set-up and disconnection procedures for line connection to a portable terminal follow the requirements of the MTS.

When a portable terminal is called from the network for a line connection, the terminal is addressed in the TRAFFIC LIST. The terminal remains in the operating state and follows the normal procedure for call set-up described in the MTS.

When the call has been disconnected, the terminal uses the stored values of CURRENT BASE and CURRENT SYSTEM CHANNEL to re-synchronize to the <SVP6>-frames. The terminal returns to the standby state when it has received a <SVP6>-frame where it is not included in the TRAFFIC LIST.

When a portable terminal initiates a call set-up for a line connection, the terminal enters operating state before sending the line connection request, and stays in this state until the call is disconnected, according to the MTS.

3.2.4

3.2.5

3.2.6

3.2.7

3.2.8

3.2.9

3.2.10

3.2.11

3.2.12

3.2.13

3.2.14

3.2.15

3.2.16

3.2.17

3.2.18

3.2.19

3.2.20

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3.2.26

3.2.27

3.2.28

3.2.29

3.2.30

3.2.31

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1990-08-13	A	MTS15 1

3.3 FORMAT DEFINITION OF <SVP>-FRAMES

FRAME TYPE <SVP>, Sweep signal

APPLICATION

The sweep signal is a periodically recurring signal from BASE. An <SVP> is transmitted by BASE for two reasons:

- 1) <SVP> marks the start of a sweep cycle.
- 2) <SVP> contains system parameters.

```
<SVP> has 2 different subtypes for mobile
terminals and 4 subtypes for portable
terminals :
```

- | | | |
|---------|---|---|
| SUBTYPE | 1 | states the values of system parameters for mobile terminals |
| | 2 | states the frequency of different channel types for mobile terminals. |
| | 3 | only relevant for portable terminals using the battery-saving protocol described in this document. This subtype contains the system parameters. |
| | 4 | states the frequency of different channel types for portable terminals. |
| | 5 | includes the MAIL LIST for portable terminals (may be used both in the battery saving mode and in the normal mobile mode) |
| | 6 | includes the TRAFFIC LIST and the timing parameters for portable terminals. |

Note 1: <SVP> of subtype .1 and 2 are not described in this Addendum. Please refer to R1-16.

Note 2: For <SVP5> and <SVP6>, the terminal should use all correctly received following blocks, even though the whole frame may not be correct. This procedure decreases the possibility of the terminal missing a list where it is addressed.

<SVP>, SUBTYPE 3

- states the values of system parameters for portable terminals.

[illegible]

1056 - A 296 6084 Ue	
1990-08-13	MTS15_1
SVPTYP	States the <SVP> subtype, value 00000011 in this case.
TXPOW	States the decrease in output power (0-255 dB below nominal level) to be used by the portable terminal. A default value of 0 is used at start-up until this signal is received.
RSSI_PROC	States the method of the signal strength measurement: 0 = FRAME 1 = CONTINUOUS The default value is FRAME.
RSSI_PERIOD	Time used by the roaming algorithm (0-255 *20 ms). Default value: 148 (2 960 ms).
MAX_REP	States the value of the variable Max_rep.
BASEST	States status of base station.
SCAN_TIME	States the length of a period (0-255 *100 ms) when the portable terminal scans other system channels. Default value: 30 (3 seconds).
BAD_BASE	Used by the roaming algorithm. 0-255 dBuV. Default value: 15.
GOOD_BASE	Used by the roaming algorithm. 0-255 dBuV. Default value: 15.
BETTER_BASE	Used by the roaming algorithm. 0-255 dB. Default value: 10.

8 class

Repres

1056 - A 296 6084 Ue.	
Date: 1990-08-13	Rev: A
File: MTS15_1	

FOLLOWING BLOCKS

If any, they contain a list of system channels to be used in base station monitoring. A frame with a list containing new system channels completely overrides the previous frame. The channel list has the following format (as described in the MAIN DOCUMENT):

FOLLOWING BLOCK #1

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	
number of channels										0	0	0	0	0	0	0
17										32 33		48				
channel #1 - UPFREQ										channel #1 - DOPREQ						
49										64 65		80				
channel #2 - UPFREQ										channel #2 - DOPREQ						
81										96 97		112				
channel #3 - UPFREQ										channel #3 - DOPREQ						
113										128 129		144				
channel #4 - UPFREQ										channel #4 - DOPREQ						
145										160						
PARITY																

The number of following blocks depends on the size of the list. The maximum number of channels in the list is stated in reference R1-06.

Continues with following block #2 on the next page.

Block 1

Page 17

No. 1056 - A 296 6084 Ue	
Date 1990-08-13	Rev. A
P. 1 of 1 MTS15_1	

FOLLOWING BLOCK #2

01	16 17	32
channel #5 - UPFREQ		channel #5 - DOFREQ
33	48 49	64
channel #6 - UPFREQ		channel #6 - DOFREQ
:		
129	144 145	160
channel #9 - UPFREQ		PARITY

FOLLOWING BLOCK #3

01	16 17	32
channel #9 - DOFREQ		channel #10 - UPFREQ
33	48 49	64
channel #10 - DOFREQ		channel #11 - UPFREQ
:		
129	144 145	160
channel #13 - DOFREQ		PARITY

additional FOLLOWING BLOCKS may follow if required.

3. NAME

4. SIGNATURE

W. 2.
1056 - A 296 6084 Ue

Date Recd
1990-08-13 A

Rev
MTS15_1

3.3.2 <SVP4>

<SVP>, SUBTYPE 4

- states the frequency of different channel types for portable terminals.

PRIMARY BLOCK

01	02	03					22	23	24	25	26	27	28	29	30	31	32
											0	0	0	0	1	1	1
MOB																	

33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
PRIO				MASK				BLOCK							

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
SVPTYP								CHATYP							

65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
UPFREQ															

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
DOFREQ															

97	98	99	100												144
0	0	0	0	0	0	0					0	0	0	0	0

145															160
PARITY															

Block

Pages

<div style="text-align: right; margin-right: 20px;"> 1056 - A 296 6084 Ue </div>	
<div style="display: flex; justify-content: space-between; font-size: small;"> Doc Date 1990-08-13 Rev A File No MTS15_1 </div>	

SVFTYP States the <SVP> subtype, value 00000100 in this case.

CHTYP States the type of channel:
 Value:
 1 Local system channel opened
 2 Not used (ignore that order)
 3 Local system channel closed (return to previous system channel)
 4 Access channel opened
 5 Access channel closed

UPFREQ Frequency number for up frequency, i.e. the frequency on which the terminal transmits.

DOFREQ Frequency number for down frequency, i.e. the frequency on which BASE transmits.

FOLLOWING BLOCK

No following blocks in this type of frame.

3 4401

34000

		No. 1056 - A-296 6084 De	
Date 1990-08-13	A	P. P. MTS15_1	

FOLLOWING BLOCKS

FOLLOWING BLOCK #1

Containing a list of terminal MAN having messages stored in the network mailbox.

01	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 1</div>	24
25	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 2</div>	48
49	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 3</div>	72
73	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 4</div>	96
97	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 5</div>	120
121	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">MAN 6</div>	144
145	<div style="position: absolute; top: 5px; left: 5px; width: 90%; border-top: 1px dashed black;"></div> <div style="position: absolute; bottom: 5px; left: 5px; width: 90%; border-bottom: 1px dashed black;"></div> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%);">PARITY</div>	160

The number of following blocks depends on the size of the list (maximum 186 MAN).

Continues with following block #2 on the next page.

SECRET

SECRET

1056 - A 296 6084 Ue

Date Recd 1990-08-13

Rev A

File No MTS15 1

FOLLOWING BLOCK #2

01 ----- 24
MAN 7

25 ----- 48
MAN 8

49 ----- 72
MAN 9

73 ----- 96
MAN 10

97 ----- 120
MAN 11

121 ----- 144
MAN 12

145 ----- 160
PARITY

additional FOLLOWING BLOCKS may follow if required.

B-64301

Reprint

№ №		
1056 - A 296 6084 Ue		
Датум Дата	Rev	Пл. Ф. №
1990-08-13	A	MTS15 1

3.3.4 <SVP6>

<SVP>, SUBTYPE 6

- contains the timing parameters used in synchronization and message transactions.

PRIMARY BLOCK

01	02	03		22	23	24	25	26	27	28	29	30	31	32
MOB							0	0	0	0	1	1	1	1

33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
PRIO			MASK				BLOCK								

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
SVPTYP								CYCLE-TIME							

65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
TIME-TO-NEXT								TRANSACTION-TIME							

81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
EVALUATE-CURRENT									EVALUATE-OTHERS						

97	104	105	112
TRAFNUM	0	0	0

[illegible]

129	136	137	144
0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0		

145 160

PARITY

		Nr. 1056 - A 296 6084 Ue	
		Issue Date 1990-08-13 A	Rev. MTS15_1
SVPTYP	States the <SVP> subtype, value 00000110 in this case.		
CYCLE-TIME	States the time (0-255 *250 ms) between the start of one operating state and the start of the next one.		
TIME-TO-NEXT	States the time (0-255 *250 ms) from bit 1 in the frame head of the received <SVP6> to the next time the terminal should enter the operating state.		
TRANSACTION-TIME	States the time (0-255 *250 ms) the terminal should stay in the operating state after receiving or-transmitting <ACK>, respectively. Default value: 40 (10 seconds)		
EVALUATE-CURRENT	Integration time (0-255 seconds) for evaluating base stations on the CURRENT_SYSTEM_CHANNEL. Default value: 60 seconds.		
EVALUATE-OTHERS	Integration time (0-255 RSSI periods) for evaluating base stations on other channels. Default value: 3 RSSI periods.		
TRAFNUM	Number of MAN:s in list (0-186).		

No. 26		1056 - A 296 6084 Ue	
Station Name	Rev	F1 F-4	MTS15_1
1990-08-13	A		

FOLLOWING BLOCKS

Containing a list of terminal
MAN or group MAN with pending
down-link traffic.

FOLLOWING BLOCK #1

01			24
MAN 1			
25			48
MAN 2			
49			72
MAN 3			
73			96
MAN 4			
97			120
MAN 5			
121			144
MAN 6			
145			160
PARITY			

The number of following blocks depends on the size of the
list (maximum 186 MAN).

Continues with following block #2 on the next page.

Index

St. No.	1056 - A 296 6084 De
Start Date	1990-08-13 A
End Date	MTS15_1

FOLLOWING BLOCK #2

01	24	MAN 7
25	48	MAN 8
49	72	MAN 9
73	96	MAN 10
97	120	MAN 11
121	144	MAN 12
145	160	PARITY

additional FOLLOWING BLOCKS may follow if required.

Read

Record

1056 - A 296 6084 Ue		
Issue Date 1990-08-13	Rev A	Rev MTS15_1

4 NETWORK LAYER

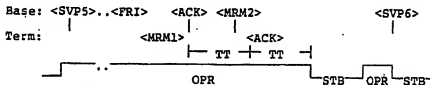
4.1 ACTIVATION/INACTIVATION

Portable terminals used in-doors are likely to lose contact with the network much more frequently than mobile terminals. They should therefore not send ACTIVE due to 'lost contact' according to the roaming procedure since this will cause considerable system signalling overhead.

Portable terminals send INACTIVE / ACTIVE when switched-off and switched-on respectively.

When a portable terminal is addressed in the MAIL LIST it has the possibility to empty the mailbox by sending an ACTIVE packet.

Example 1: The terminal is addressed in the MAIL LIST of <SVP5> and the network has one or more <MRM> placed in the mailbox.



TT = TRANSACTION-TIME
OPR = terminal in operating state
STB = terminal in standby state
MRM1 = MPAK ACTIVE
MRM2 = any MPAK from mailbox

Mr. No.		1056 - A 296 6084 Ue	
Origin Date	Rev	P. No.	
1990-08-13	A	MTS15 1	

4.2 NEW PARAMETERS IN MPAK INFO (terminal information)

The parameter terminal type information (TTI) is used by the network to separate terminals with different functionality.

Terminals with the battery-saving protocol according to this document have:

TTI = 4, terminal type 4. (octet 6)

The parameter MODE (octet 12) identifies the operating mode of the terminal:

0 = NORMAL MOBILE MODE

1 = BATTERY-SAVING MODE

2-255 = reserved

4.3 ADDITIONAL MPAK - MODE (mode information)

A new MPAK is included for terminals using the battery-saving protocol. This MPAK is used to inform the network that the terminal has changed from battery saving mode to normal mobile mode and vice versa.

The portable terminal always has the possibility to change to normal mobile mode, e.g. for a major data transaction. In order to inform the network of this change of mode, the terminal sends the new MPAK called MODE. This MPAK is within the packet class DTESERV (3) and has the packet type 24.

Chart

Signature

1056 - A 296 6084 Ue	
1990-08-13 A	MTS15_1

MODE (mode information):

Designated sender:

The portable terminal.

Designated addressee:

The network.

Raised flags:

No raised flags.

Criteria for generating the packet:

When a portable terminal changes from the battery-saving mode to the normal mobile mode this packet is used to inform the network.

The same packet is sent to the network, but with a different mode identifier, when the terminal changes to the battery-saving mode.

The network's normal action when receiving the packet:

The network registers the operating mode of the terminal. If the terminal is using the battery-saving protocol, the terminal is addressed in the TRAFFIC LIST when traffic is pending.

If the terminal is operating as a mobile terminal the network sends traffic immediately to the terminal.

The terminal's normal action when receiving the packet:

The terminal does not normally receives this packet.

Length of the packet:

9 octets.

Section

Reserved

1056 - A 296 6084 Ue	
1990-08-13	MTS15_1

MODE as generated by the terminal:

MPAR-COMMON COMPONENT:

octet 1-3:	sender: the terminal
octet 4-6:	addressee : the Mobitex Network
octet 7:	0 0 0 0 0 0 0 0
octet 8:	1 1 0 1 1 0 0 0

TYPE DEPENDENT COMPONENT:

octet 9 :	mode identifier
-----------	-----------------

mode identifier :

- 0 = NORMAL MOBILE MODE
- 1 = BATTERY-SAVING MODE
- 2-255 = reserved

3 decet

Regime

Doc No		1056 - A 296 6084	De
Revision Date	Rev	1990-08-13	A
		F. File	
		MTS15_1	

5 APPLICATION LAYER

5.1 REQUIREMENTS

5.1.1 'Fall-back' to normal mobile operating mode

If the terminal cannot find any signalling required for the operation of the battery-saving protocol (<SVP6>), but detects <SVPl> required for mobile terminal operation, the terminal may act as mobile terminal. The user should be informed of this.

The MPAK MODE is sent to the network, informing that the terminal has changed to the normal mobile mode.

5.1.2 User notification of 'lost contact'

When the terminal loses contact with the network and starts the quick channel monitoring, the operator of the terminal should be notified.

5.1.3 RSSI when transmitting

It is recommended to display the received signal strength to the user, especially when the terminal is going to transmit, so the user can move the terminal to a suitable location.

3.64477

3.64477

1056 - A 296 6084 Ue		
Doc. No.	Rev.	Fr. Fr.
1990-08-13	A	MTS15_1

5.2 RECOMMENDATIONS

5.2.1 Manual selection of operating mode

It is recommended that the terminal enters the normal mobile mode of operation, when it is mounted into a battery charger, e.g. in a car.

The user or the terminal itself initiates the transmission of the MPAK MODE to the network. This message will then identify the operating mode of the terminal.

5.2.2 Prevention from automatic quick channel monitoring

The user should be allowed to manually switch off the quick channel monitoring function in order to prevent this automatic function from continuously running, or to prevent the terminal from repeated attempts to enter the quick channel monitoring,

It is also recommended that the terminal has some kind of watchdog function implemented, limiting the operating time in quick channel monitoring mode.

5.2.3 Manual initiation of quick channel monitoring

If the portable terminal is implemented without automatic quick channel monitoring functions it is recommended that this function can be manually started.

B.1.1.1

B.1.1.1

1056 - A 296 6084 De	
Date 1990-08-13 A	File # MTS15_1

6 MASC INTERFACE

For type approval the terminal must contain a 'MASC' interface. The same requirements apply as for the mobile terminal concerning the 'MASC' interface, which means that the PA- and KA-commands should be included during type testing.

An additional type test command, PA07, has been added for terminals operating according the battery-saving protocol.

3.1.1.1

3.1.1.2

My No 1056 - A 296 6084 Ue	
Drawn Date 1990-08-13 A	PC No MTS15_1

6.1 PA-command (request/list of battery-saving protocol parameters)

The PA07-command is used by the type test terminal to request battery-saving protocol parameters and by the portable terminal to send these parameters as a reply to the request.

The structure of the text field in a request for parameters from the type test terminal to the portable terminal :

PA07

4 bytes

The structure of the text field in a reply from the portable terminal to the type test terminal (list of parameters):

PA07 SP list of parameters
4 1 >=4 bytes

The data field is empty.

The list of parameters consists of a number of ASCII coded hex numbers separated by , (comma). If a parameter is not available in the terminal, this parameter is not included in the reply. The parameters are sent in the following order:

Parameter	No of bytes
Cycle time	1
Time To next	1
Transaction time	1
Evaluate_current	1
Evaluate_others	1

The meaning and the structure of the different parameters can be found in the chapter 'FORMAT DEFINITION OF <SVP>-FRAMES' of this document.

Example of PA07-command:

MCU	<-----	TERMINAL
PA07 01,02,03,04,05	----->	PA07
or		
PA07	----->	

Doc No		1056 - A 296 6084 Ue	
Date	Rev	Iss. F.A	
1990-08-13	A	MTS15_1	

7 MOBITEK TERMINAL SPECIFICATION REFERENCE LIST

This document includes a number of references, made to other sections in the terminal specification. The list below shows these references, together with the page(s) they are made on. Please note that a section could be referred to several times on the same page.

RI-06, 17
RI-09, 8
RI-16, 6, 7, 8, 14

Below are the reference designations listed.

Reference	Section
RI-01	Arrangement of the documents
RI-02	MOBITEK System description
RI-03	General description of terminals
RI-04	Terminology
RI-05	References
RI-06	Network operator information
RI-08	Application layer
RI-09	Network layer
RI-11	Interface requirements, fixed terminals
RI-12	Other requirements, fixed terminals
RI-16	Link layer, mobile terminals
RI-17	Physical layer, mobile terminals
RI-18	Radio equipment, mobile terminals
RI-19	Other interfaces, mobile terminals
RI-20	Other requirements, mobile terminals

8.4.4.4.1

8.4.4.4.2